

THE INFLUENCE OF SOWING TIME ON THE YIELD OF SWEET CORN UNDER THE NATURAL CONDITIONS OF THE BLACK CRIȘUL MEADOW IN 2025

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RESEARCH ARTICLE

Abstract

The research aimed to assess the influence of sowing time and fertilization regime on the yield performance of the sweet corn hybrid Dessert R78 under the specific pedoclimatic conditions of the Black Criș Meadow in 2025. The experiment was organized in a two-factor design, including four fertilization variants (control, organic compost, NPK complex, and NPK + microelements) and two sowing times. Results revealed that early sowing favored higher yields, while delayed sowing caused a slight reduction in production. The NPK + microelements treatment achieved the maximum yield of 22.79 t/ha, exceeding the control by 128.8%. Statistical analysis indicated a highly significant influence of fertilization and a moderate effect of sowing time, demonstrating the hybrid's adaptability and high productive potential in local environmental conditions.

Keywords: sweet corn, sowing time, fertilization, production, Black Criș Meadow.

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INTRODUCTION

Sweet corn (*Zea mays* convar. *saccharata*) is one of the most valuable vegetable species cultivated in temperate regions, appreciated both for its sweet taste and distinctive aroma, as well as for its high nutritional value (Gavrić & Omerbegović, 2021). Due to its rich content of simple sugars, vitamins, and minerals, sweet corn is a crop of significant economic and dietary interest, intended for consumption either fresh or in processed form (Jung et al., 2014).

The yield and quality of sweet corn production are influenced by a range of technological and environmental factors, among which the sowing time plays a crucial role (Uğur & Maden, 2015). Choosing the optimal sowing moment determines the rate of germination, the dynamics of plant growth, and, consequently, the level of production. Soil temperature at the time of sowing has a direct influence on germination and early plant development, and deviations from the optimal range can lead to reduced plant density, shifts in growth stages, and decreased final yields (Rajablarjani et al., 2014).

In addition to sowing time, the fertilization regime significantly contributes to

the physiological and productive performance of sweet corn (Soare et al., 2019). The interaction between fertilization and sowing time can have complex effects on growth dynamics, directly influencing final yield and crop quality (Sofyan et al., 2019).

The aim of this study is to analyze the influence of sowing time on sweet corn production under the specific conditions of the Black Criș Meadow in 2025, in correlation with four applied fertilization variants. The experiment included a total of eight experimental plots, resulting from the combination of four fertilization variants — (1) control with no fertilization, (2) organic fertilization with compost, (3) fertilization with a complex fertilizer, and (4) fertilization with a complex fertilizer enriched with micronutrients — with two distinct sowing times:

Sowing Time I – at the attainment of the optimal sowing temperature

Sowing Time II – 14 days after the optimal sowing temperature is reached

Through the comparative analysis of yields obtained according to sowing time and fertilization variant, the study aims to identify the optimal period for sowing sweet corn under the pedoclimatic conditions of the Black Criș Meadow and to formulate recommendations to help maximize crop yield.

The research results can provide useful information for both agricultural producers and agronomy specialists, supporting the adoption of technological strategies adapted to current climatic conditions and the principles of sustainable agriculture.

MATERIALS AND METHODS

The study was conducted in the Black Crișul Meadow, an area characterized by fertile soils and a moderately temperate-continental

climate. Precipitation patterns and the average temperature during the sweet corn growing period were monitored to assess the influence of climatic conditions on the experimental results.

For precise localization of the experimental field, Figure 1 presents a satellite image of the experimental site.

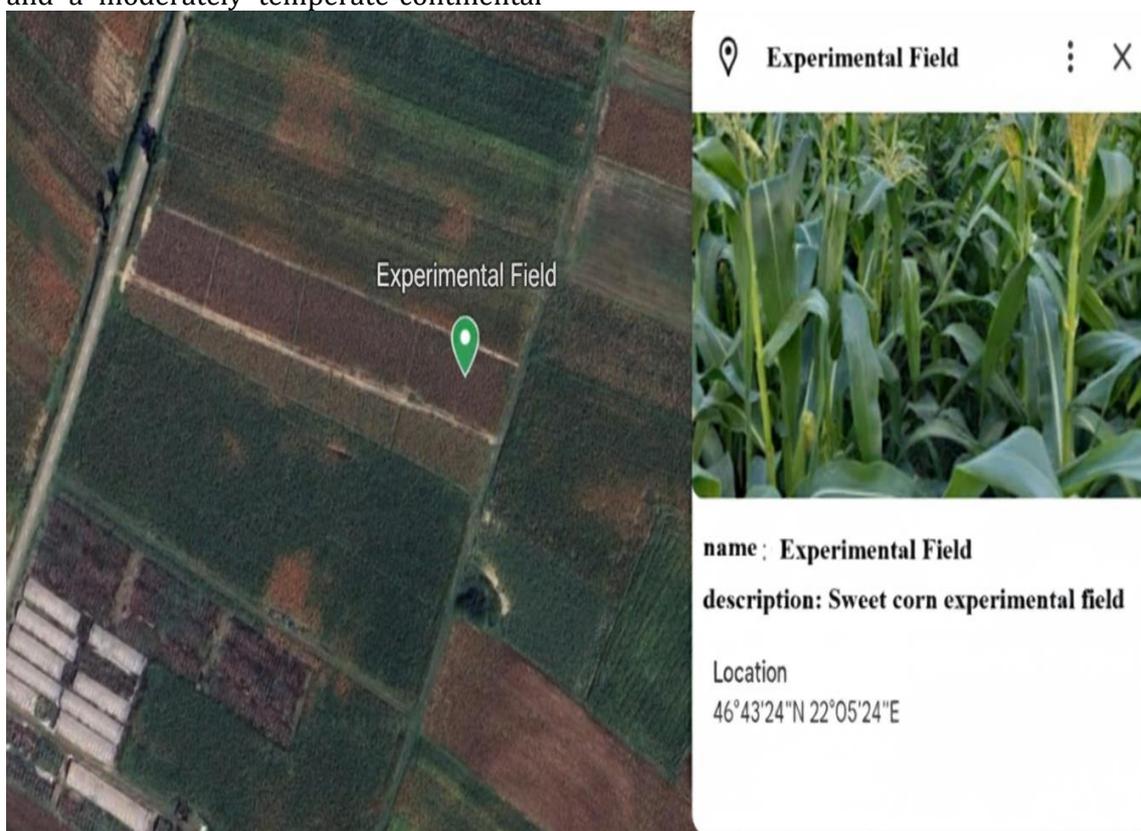


Figure 1 Satellite image of the experimental field

The research was conducted on Gleyic Alluviosol soils, ranging from slightly silty to moderately silty, located in Căpâlna, Bihor County. These soils developed on fluvial deposits and exhibit a characteristic profile up to 105 cm deep, with morphological features specific to floodplain environments. The soil texture is predominantly silty, with a significant content of fine sand and clay, which results in a

moderate capacity to retain water and essential nutrients for agricultural crops.

To assess the influence of climatic conditions on the development of the sweet corn crop, precipitation and average air temperature during the growing period were monitored. Table 1. presents the monthly average temperatures, while Table 2 illustrates the monthly average precipitation values recorded in 2025.

Table 1.

Average air temperature

Month	Average air temperature
January	3.4
February	1.0
March	8.9
April	12.6
May	14.0
June	23.3
July	23.4

The analysis of the monthly average temperatures in the Black Crișul Meadow during the period January–July 2025 highlights a thermal regime characterized by a pattern typical for the climatic conditions of the lowland area, with a gradual increase in average values from the beginning of the year to the summer months.

The winter months were relatively mild, with an average temperature of 3.4°C in January and 1.0°C in February, slightly above the long-

term regional average, indicating a less severe winter. In March (8.9°C) and April (12.6°C), a progressive warming was observed, favorable for soil preparation and the onset of the optimal sowing period for spring crops.

In June (23.3°C) and July (23.4°C), high temperatures were recorded, typical for the period of intensive vegetative growth, conducive to the development of green biomass and sugar accumulation in the cobs, provided that the water regime is adequate.

Table .2

Amount of precipitation (l/m²)

Month	Amount of precipitation (l/m ²)
January	28.2
February	12.2
March	84.0
April	9.1
May	35.3
June	9.0
July	42.4

The analysis of the average precipitation recorded in the Black Crișul Meadow during the period January–July 2025 shows an uneven distribution of rainfall, with alternation between months with abundant precipitation and months with deficits.

The winter months received a moderate amount of rainfall, with 28.2 mm in January and 12.2 mm in February, values that allowed a slight recharge of soil water reserves but remained below the long-term average for this period. In March (84.0 mm), a significant peak

in precipitation was recorded, contributing to the restoration of soil moisture before the sowing campaign and creating favorable conditions for seed germination.

In contrast, April (9.1 mm) and June (9.0 mm) were dry months, with a pronounced precipitation deficit. May (35.3 mm) brought a slight improvement in the water regime, while July (42.4 mm) partially compensated for the lack of water in the preceding months.

Overall, 2025 was characterized by a deficient and uneven rainfall regime, with periods of drought alternating with episodes of heavy rainfall. This uneven distribution of precipitation played an important role in differentiating yields according to sowing time, affecting both germination and the vegetative growth dynamics of sweet corn.

The study used the sweet corn hybrid Dessert R78, a semi-early variety notable for a growing period approximately 8 days longer than the Dessert R70 hybrid, which it replaces in the recommended crop portfolio. The hybrid is suitable for sowing from mid-April to early June and is adapted to the climatic conditions of the lowland area.



Figure 1. Dessert R78

The plants are semi-tall, morphologically well-balanced, with cobs approximately 21 cm long, positioned at medium height on the stem, and with 16–18 rows of kernels. The kernels are deep, intensely golden-yellow, with a high sugar content, giving the hybrid superior taste quality.

Dessert R78 exhibits genetic resistance to the Maize Dwarf Mosaic Virus (MDMV), a trait that contributes to production stability under biotic stress. Due to its adaptability and high yield potential, the hybrid is recommended both for fresh consumption and for industrial processing.

The experiments were conducted on a field organized into 8 plots, each covering 1 a (5 m width × 20 m length). To evaluate the effect of different fertilization strategies on the crop, four fertilization variants were applied, sown in two different periods as follows:

V1 (Control) – unfertilized crop, used as a reference for evaluating the effect of applied treatments.

V2 (Organic fertilization) – application of compost before sowing at a rate of 30 t/ha, to improve soil structure and increase nutrient availability.

V3 (Complex mineral fertilization) – application of NPK fertilizer at 300 kg/ha, providing essential macroelements for plant development.

V4 (Complex mineral fertilization with micronutrients) – application of NPK fertilizer at 300 kg/ha, supplemented with micronutrients (Zn, B, Fe, Mn) at 30 kg/ha, aimed at optimizing nutrient uptake, supporting plant physiological processes, increasing yield potential, and improving crop quality.

The crop was sown in two distinct periods to assess the influence of sowing time on the development and yield of sweet corn:

First sowing period – performed when the soil reached the optimal sowing temperature, serving as the reference condition for normal and uniform crop development.

Second sowing period – performed 14 days after the soil reached the optimal temperature, to analyze the effects of delayed sowing on growth, development, and productivity.

By combining the two sowing periods with the four fertilization variants, the experiment included a total of 8 experimental plots, each monitored for growth, development, and yield characteristics.

The experiment was organized using the Latin rectangle method, ensuring that each variant was applied in a manner that controlled for spatial variability of soil and environmental conditions. This experimental design allowed for a rigorous evaluation of the treatments' effects on crop performance.

For field preparation, standard agrotechnical practices specific to the area were applied. The land was plowed in autumn, followed by two discing operations in spring. Before sowing, a harrowing operation was performed to create a uniform, well-leveled seedbed, favorable for rapid and uniform plant emergence.

Sowing was carried out at a density of 55,000 seeds/ha, considered optimal for semi-early sweet corn hybrids. Fertilization was applied manually according to the experimental variant, as described above (control, organic, complex mineral, complex mineral with micronutrients).

Sweet corn harvesting was performed manually when the plants reached the milk-

dough stage, corresponding to the optimal stage for cob utilization. Cobs from each experimental plot were harvested and weighed, and the data were compiled to calculate the average yield per hectare (t/ha).

The results were statistically processed using analysis of variance (ANOVA) to determine the significance of differences between the variants.

Table.3

Calculation of the mean, differences, and percentage variation

Variant	Sowing time I	Sowing time II	Average (kg/ha)	Difference from control
V1	10490	9430	9960	-
V2	17520	16620	17070	71,3%
V3	21040	20100	20570	106,5%
V4	23200	22380	22790	128,8%

The analysis of variance (ANOVA) showed that the effect of fertilization on sweet corn yield was highly statistically significant ($F = 144.29$; $p < 0.001$). The interaction between sowing time and fertilization was not significant. The highest yields were obtained in variant V4 (NPK + micronutrients), with 22.79 t/ha, followed by V3 (NPK) – 20.57 t/ha. The results confirm the importance of balanced fertilization and the selection of the optimal sowing time for maximizing the yield of the Dessert R78 hybrid under the conditions of the Black Crişul Meadow.

CONCLUSION

The sweet corn hybrid Dessert R78 stood out for its high yield potential, demonstrating good adaptability to the pedoclimatic conditions of the Black Crişul Meadow area.

The sowing time had a significant influence on yield, with the highest values obtained from early sowing (Sowing Time I), while delayed sowing (Sowing Time II) resulted in an average reduction of 4–6%.

Fertilization had a decisive effect on yield, with the differences between variants being highly statistically significant ($p < 0.001$). The V4 variant (NPK + micronutrients) recorded the highest yield, 22.79 t/ha, exceeding the control (V1) by 128.8%, followed by V3 (NPK) with 20.57 t/ha.

The interaction between sowing time and fertilization variant was not significant, indicating the stability of the Dessert R78

hybrid's yield in relation to variations in sowing time.

The results confirm that for the Dessert R78 hybrid, the optimal sowing time is when the soil temperature reaches 12°C, and the application of a complex NPK fertilization supplemented with micronutrients ensures the maximum utilization of the hybrid's biological potential.

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